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10. Assistant Commissioner for Patents
Box Patent Applications
Washington D.C. 20231

Attorney Docket No.069765/0104

(must include alphanumeric codes if no inventors named)

UTILITY PATENT APPLICATION TRANSMITTAL
(new nonprovisional applications under 37 CFR 1.53(b))

Transmitted herewith for filing is the patent application of:

INVENTOR(S): Hisaaki SATO, Ikuo MOGI, Masato KUMAGAI, Munehiro KUDO,
and Keiichi KAI

**TITLE:AN APPARATUS FOR CONTROLLING A THROTTLE VALVE ELECTRONICALLY IN AN
INTERNAL COMBUSTION ENGINE**

In connection with this application, the following are enclosed:

APPLICATION ELEMENTS:

XX Specification - 12 TOTAL PAGES

(preferred arrangement:)

- Descriptive Title of the Invention
- Cross Reference to Related Applications
- Statement Regard Fed sponsored R&D
- Reference to Microfiche Appendix
- Background of the Invention
- Brief Summary of the Invention
- Brief Description of the Drawings (if filed)
- Detailed Description
- Claim(s)
- Abstract of the Disclosure

XX Drawings - Total Sheets 4

____ Declaration and Power of Attorney - Total Sheets ____

____ Newly executed (original or copy)

____ Copy from a prior application (37 CFR 1.63(d))

(relates to continuation/divisional boxes completed) - NOTE: Box below

____ DELETION OF INVENTOR(S) - Signed statement attached deleting inventor(s)
named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).

____ Incorporation By Reference (useable if copy of prior application
Declaration being submitted)

The entire disclosure of the prior application, from which a COPY of the
oath or declaration is supplied as noted above, is considered as being
part of the disclosure of the accompanying application and is hereby
incorporated by reference therein.

____ Microfiche Computer Program (Appendix)

____ Nucleotide and/or Amino Acid Sequence Submission (if applicable,
all necessary)

- ____ Computer Readable Copy
- ____ Paper Copy (identical to computer copy)
- ____ Statement verifying identify of above copies

ACCOMPANYING APPLICATION PARTS

- ____ Assignment Papers (cover sheet & document(s))
- ____ 37 CFR 3.73(b) Statement (when there is an assignee)
- ____ English Translation Document (if applicable)

☒ Information Disclosure Statement (IDS) with PTO-1449. 5 Copies of IDS Citations
☐ Preliminary Amendment
☒ Return Receipt Postcard (MPEP 503)
☐ Small Entity Statement(s)
☐ Statement file in prior application, status still proper and desired.
☐ Certified Copy of Priority Document(s) with Claim of Priority
(if foreign priority is claimed).
☐ OTHER:

If a **CONTINUING APPLICATION**, check appropriate box and supply the requisite information:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP)
of prior application Serial No. .

☐ Amend the specification by inserting before the first line the following sentence: --This application is a continuation, divisional or continuation-in-part of application Serial No. , filed --

CORRESPONDENCE ADDRESS:

Foley & Lardner Address noted above.
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Fax Number: (202) 672-5399

FEE CALCULATIONS: (Small entity fees indicated in parentheses.)


(1) For	(2) Number Filed	(3) Number Extra	(4) Rate	(5) Basic Fee \$790 (\$395)
Total Claims	12 - 20 =	0	x \$22 (x \$11)	0.00
Independent Claims	2 - 3 =	0	x \$82 (x \$41)	0.00
Multiple Dependent Claims			\$270 (\$135)	0.00
Assignment Recording Fee per property			\$40	0.00
Surcharge Under 37 C.F.R. 1.16(e)			\$130 (\$65)	\$130.00
TOTAL FEE:				\$920.00

METHOD OF PAYMENT:

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Respectfully submitted,

Date: March 5, 1998
Docket No.: 069765/0104


Richard L. Schwaab
Reg. No. 25,479

300

SECTION 8

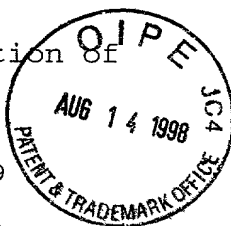
IN THE UNITED STATES PATENT AND TRADEMARK OFFICEATTY. DOCKET NO. 069765/0104

In re Patent Application of

Hisaaki SATO et al.

Serial No. 09/035,069

Filed: March 5, 1998



ATTN: BOX MISSING PARTS

For: AN APPARATUS FOR CONTROLLING A THROTTLE VALVE
ELECTRONICALLY IN AN INTERNAL COMBUSTION ENGINE

TRANSMITTAL LETTER

Assistant Commissioner for Patents
Washington, D. C. 20231

Sir:

Responsive to the Notice to File Missing Parts of
Application under 37 CFR 1.53(d) mailed June 15, 1998,
attached hereto are the following to complete the formal
filing requirements in the above-identified application:

XX Declaration and Power of Attorney signed
by each Inventor.

XX Check in the amount of \$960.00 in payment
of the 790.00 official Government filing
fee, including 130.00 surcharge and 40.00
Assignment recordation fee.

 Small Entity Declaration signed by or on
behalf of each individual, concern or
organization having rights in the subject
invention.

 790.00 OP
XX 130.00 OP Assignment to UNISIA JECS CORPORATION with
transmittal letter and check covering
recordation fee. (recordation fee of \$40
included in attached check).

XX Claim for Convention Priority with
certified copy of the priority document.

05035069-0305050

08/15/1998 NOTIFIED 00000018 09035069

01 FC:101
02 FC:105

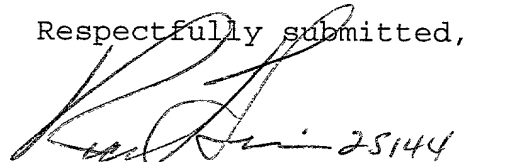
Serial No. 09/035,069

XX A copy of the Notice to File Missing Parts
of Application (Form PTO-1533) mailed June
15, 1998.

The Commissioner is hereby authorized to charge any
additional fees or credit any overpayment to Deposit Account
No. 19-0741.

Receipt is now awaited by Applicants of the official
Filing Receipt confirming the above-noted filing date and
Serial Number.

Respectfully submitted,

A handwritten signature in dark ink, appearing to read 'Richard L. Schwaab', is written over a horizontal line. To the right of the signature, the number '25144' is handwritten.

Richard L. Schwaab
Reg. No. 25,479

August 14, 1998

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065050-6905060

AN APPARATUS FOR CONTROLLING A THROTTLE VALVE
ELECTRONICALLY IN AN INTERNAL COMBUSTION ENGINE

Background of the Invention

1. Field of The Invention

5 The present invention relates to improvements to an apparatus for controlling a throttle valve electronically, such as an electronic motor, in an internal combustion engine.

2. Description of The Background Art

10 The previously known apparatus 1, as shown in Figure 6, is installed in an intake air passage of an internal combustion engine, and the actuator 2 (such as an electronic motor) generates driving power on the basis of a driving signal of the control unit, which can
15 open/close the throttle valve through the gear wheel transfer structure 3 and the axis 4 and related structure. The actuator can make an adjustment to the open angle of the throttle valve, which is separated from the accelerator operation of the driver. However, the
20 actuator 2 is fixed on the flange 1B of the body 1A with a bolt 6. Thus, a one end supporting structure is used, which has the defects discussed below.

 A one end supporting structure does not have enough anti-vibration control, and the actuator 2 is vibrated
25 easily by the contrary rotation power on one end 2A side, which is the starting point. This problem could be reduced by making a heavy wall thickness of the flange and the body of the actuator 2, or increasing the strength of the internal structure of the actuator 2.
30 However, this increases the weight, the size, and the cost.

 Furthermore, the anti-vibration characteristics may be improved by fixing the free end 2B side of the

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actuator 2 (non-output side) on the case 1C of the body 1A with a press fit. But in this case, high accuracy may be needed to maintain the precision position to the gear wheel transfer structure 3. As a result, this may make assembly more difficult and increase the cost by a large amount.

Summary of the Invention

It is, therefore, an object of the present invention to provide an apparatus for controlling a throttle valve electronically in an internal combustion engine which addresses the above situation by improving the anti-vibration characteristics, while reducing the cost and providing a simple structure.

In view of the above, an apparatus for controlling a throttle valve electronically according to the present invention comprises a throttle valve installed in an intake air passage of an internal combustion engine, and an actuator to control the throttle valve to open/close, and a supporting member to fasten a body of the actuator on the output side of the actuator, and a cover member to cover the body of the actuator, which has a predetermined gap to the cover member, and which is supported independently from open/close control of the throttle valve on the non-output side of the actuator, and an elastic member in the predetermined gap.

With such a structure for the present invention, the non-output side of the body is supported by the elastic member, and both ends are supported instead of one end, and the anti-vibration characteristics can be improved effectively even though a simple and low cost structure is used.

That is to say, it is not necessary to make a heavy wall thickness of the flange by which the actuator 2 is supported or of the body of the actuator, and increase the strength of the internal structure of the actuator,

and increase the weight, the size, and the cost of the actuator.

Furthermore, the actuator can be fixed flexibility on, and there is no need to require high precision work for precision positioning, which can make assembly more difficult and increase the cost.

In addition, the elastic member is placed in the predetermined gap which is formed between the cylindrical outer side of the actuator which is covered by the cover member on the non-output side and the inside of the cover member, or the elastic member is placed in the predetermined gap which is formed between the plane perpendicular to the output axis of the actuator and the inside of the cover member.

Also, the present invention further comprises fixing means to fix the elastic member in the predetermined gap which is formed between the cylindrical outer side of the actuator, which is covered by the cover member on the non-output side, and the inside of the cover member, and as a result, the fixing means restricts the movement of the elastic member along the cylindrical central axis of the non-output side of the actuator.

Brief Description of the Drawings

Figure 1 is a section view of an apparatus for controlling a throttle valve electronically according to the first embodiment of the present invention.

Figure 2 is a part side view of using another elastic member.

Figure 3(A) is a part of another elastic member magnified.

Figure 3(B) is a front view of the elastic member shown Figure 3(A).

Figure 3(C) is an III(C)-III(C) section view of Figure 3(B).

Figure 4 is a part of the second embodiment of the present invention magnified.

Figures 5(A) and 5(B) are views of another elastic member.

Figure 6 is a section view of an apparatus for controlling a throttle valve electronically according to the previously known apparatus.

Detailed Description of the Preferred Embodiments

A more detailed description of the present invention is given below on the basis of attached figures which are provided with the same numbers for the same elements as shown in Figure 6.

The first embodiment associated with the present invention is shown in Figure 1, which indicates the throttle valve 5 installed in an intake air passage of an internal combustion engine, and the intake air passage area can be adjusted by the throttle valve 5, which opens/closes around the rotation axis 4. The actuator 2, such as an electronic motor, generates driving power on the basis of a driving signal of the control unit (not shown), which can make an adjustment to the open angle of the throttle valve, which is separated from the accelerator operation of the driver.

The actuator 2 associated with the first embodiment is fixed via the flange 2D of the body of the actuator 2 to the base plate 7 with a bolt 8, and the actuator 2 and base plate 7 are fixed on the body 1A by fixing the base plate 7 to the flange 1B of the main body 1 with the bolt 6. The bolt 6, the base plate 7, and the bolt 8 form a supporting member.

However, if the actuator 2 is fixed to the body 1A on only one end 2A side (output side) of the actuator 2, the anti-vibration characteristics will deteriorate at one end. But in the first embodiment, the actuator is not only fixed to the body 1A on one end 2A side (output side), but also on the other end 2B side (non-output side). As a result, anti-vibration characteristics are improved. An elastic member 9 (an o-ring made of rubber,

silicon, and so on) is fixed between the outer surface of the cylindrical projection 2C which is positioned on one end 2B side of the body of the actuator 2 and the inner surface of the case, or cover, 1C of the body 1A in which the cylindrical projection 2C is covered, and therefore, the end 2B side of the body of the actuator 2 is supported by the body 1A. In this way, a supporting structure which supports both ends is provided instead of a structure supporting one end. The structure by the end 2B side of the body of the actuator 2 is supported on the body 1A with the o-ring, and the anti-vibration characteristic is improved effectively even though a simple and a low cost structure is provided. That is to say, it is not necessary to make a heavy wall thickness of the flange by which the actuator 2 is supported or of the body of the actuator, and increase the strength of the internal structure of the actuator, and increase the weight, the size, and the cost of the actuator.

Furthermore, the actuator can be fixed flexibility on the case 1C of the body 1A with the o-ring, which does not require high precision work for precision fit and precision positioning to the gear wheel transfer structure 3. This makes assembly easier and reduces cost.

In the preferred embodiment, the o-ring for the elastic member is a standard o-ring, which is preferable from the view point of lower cost. In addition, a back-up-ring 10 (the ring member consists of metal, plastic, gum, silicon and so on) which is positioned between the elastic member 9 and one end 2E of the body of the actuator 2, has the function of fixing the member 9 and preventing torsion and other movement of the elastic member 9 as shown in Figure 1, and is preferable from the view point of cost. Furthermore, the outer surface of the projection 2C of the body of the actuator 2 can be in the shape of a step and have the same function and effect as the back-up-ring 10 as shown in Figure 1. Also, the inner surface of the case 1C of the body 1A can have a

flute in which the elastic member 9 is supported, and have the same function and effect as the back-up-ring 10 as shown in Figure 1.

The elastic member 9 can also be an elastic member of wave shape (metal, plastic, gum, silicon and so on) as shown in Figure 2.

Although the first embodiment has the elastic member 9 fixed on the outer surface of the projection 2C of the body of the actuator 2, the invention is not limited to the above-mentioned structure. If supporting structure is provided at both ends instead of at one end by other means, for example, the elastic member 9 is fixed on the outer surface of the body of the actuator 2 other than the projection 2C, a similar result will be obtained.

In the above first embodiment, it is preferable to have the back-up-ring 10 positioned between the elastic member 9 and one end 2E of the body of the actuator 2, for ease of assembly and to prevent the torsion and other movement of the elastic member 9 as shown figure 1. Alternatively, o-ring 9A, which has a cross-sectional flat shape and a projection 9B in the direction of the outer surface for keeping the strength of supporting the actuator 2, as shown in Figures 3(A) to 3(C) can be provided. If the o-ring 9A is used, it is capable of adequately supporting the actuator, allows easy assembly, and prevents the torsion of the elastic member.

Next is a description of a second embodiment of the present invention. The above first embodiment employs the elastic member 9 fixed on the outer surface of the projection 2C of the body of the actuator 2, which is supported at both ends by supporting structure to improve the anti-vibration characteristics. The second embodiment can also improve the anti-vibration characteristics, as discussed below.

A more detailed description of the second embodiment is provided with same numbers for the same elements as shown in Figure 6 or Figure 1 associated with the first embodiment.

The elastic member 11 (for example, a coil shaped spring) is fixed between one end of the projection 2C of the body of the actuator 2 and the inner surface of the case of the body 1A, as shown in Figure 4. In addition, a part of the elastic member 11 is fitted into a depression, which fixes member 11. Therefore, the movement (vibration) of the end 2B of the body of the actuator 2 is prevented by the strength of supporting the actuator 2 on one end of the projection 2C using the elastic member 11 which produces friction between the elastic member 11 and the end of the projection 2C. This improves anti-vibration characteristics effectively even though the structure is simple and inexpensive. That is to say, it is not necessary to make a heavy wall thickness of the flange by which the actuator 2 is supported or of the body of the actuator, and increase the strength of the internal structure of the actuator, and increase the weight, the size, and the cost of the actuator. Furthermore, the end 2B side of the actuator can be fixed flexibility on the case 1C of the body 1A, which eliminates high precision work for precision fit and precision positioning to the gear wheel transfer structure 3. This makes assembly easier and reduces cost.

The elastic member 11 can also be an elastic member of a solid or hollow-body shape or bow shape (gum, silicon and so on) instead of the coil shaped and an elastic member of a ring shape (gum, silicon and so on). Furthermore, a wave-washer as shown in the Figure 5(A) end view and Figure 5(B) sectional view can be employed instead of the elastic member of the coil shaped as shown in Figure 4.

In addition, the invention can use both the elastic member 9 of the first embodiment and the elastic member 11 of the second embodiment, which can further improve the anti-vibration characteristics effectively, and the present invention can also be adaptable to a structure which does not have the projection 2C.

Furthermore, the present invention can also be adapted to a case 1C which is not integral with the body 1A. Also, the present invention can be adapted to the case 1C which only covers one end 2B of the body of the actuator 2 (i.e., only part of the non-output side) instead of covering most of the actuator.

The entire contents of Japanese Patent Application No. Tokuganhei 9-058662, filed March 13, 1997, is incorporated herein by reference.

003069-00598

What Is Claimed Is:

1. An apparatus for controlling a throttle valve electronically in an internal combustion engine, comprising:

- a) a main body;
- 5 b) a throttle valve installed in an intake air passage of an internal combustion engine;
- c) an actuator to control said throttle valve to open/close;
- 10 d) a supporting member to fasten a body of said actuator to said main body on an output side of said actuator;
- e) a cover member to cover said body of said actuator and which is supported near a non-output side of said actuator by the main body, said actuator having a
15 predetermined gap to said cover member; and
- f) an elastic member in said predetermined gap on said non-output side of said actuator.

2. An apparatus for controlling a throttle valve electronically in an internal combustion engine as set forth in claim 1, wherein said elastic member is formed between a cylindrical outer side of said actuator on the
5 non-output side and inside of said cover member.

3. An apparatus for controlling a throttle valve electronically in an internal combustion engine as set forth in claim 1, wherein said elastic member is formed between a plane perpendicular to an output axis of said
5 actuator and inside of said cover member.

4. An apparatus for controlling a throttle valve electronically in an internal combustion engine as set forth in claim 1, which further comprises a fixing member to fix said elastic member at a predetermined position
5 inside of said cover member.

5. An apparatus for controlling a throttle valve electronically in an internal combustion engine as set forth in claim 4, wherein said elastic member is formed between a cylindrical outer side of said actuator on the non-output side and inside of said cover member, and said fixing member restricts movement of said elastic member along a cylindrical central axis of said non-output side of said actuator.

6. An apparatus for controlling a throttle valve electronically in an internal combustion engine as set forth in claim 1, wherein said elastic member is an o-ring.

7. An apparatus for controlling a throttle valve electronically in an internal combustion engine, comprising:

- a) a main body;
- b) an open/close means for adjusting flow in an intake air passage of an internal combustion engine;
- c) an actuator means for controlling said open/close means;
- d) a supporting means for fastening a body of said actuator means to said main body on an output side of said actuator means;
- e) a cover means for covering said actuator means and which is supported near a non-output side of said actuator means by the main body, said actuator means having a predetermined gap to said cover means; and
- f) an elastic means in said predetermined gap on said non-output side of said actuator means.

8. An apparatus for controlling a throttle valve electronically in an internal combustion engine as set forth in claim 7, wherein said elastic means is formed between a cylindrical outer side of said actuator means on the non-output side and inside of said cover means.

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12. An apparatus for controlling a throttle valve electronically in an internal combustion engine as set forth in claim 7, wherein said elastic means is an o-ring.

Abstract of the Disclosure

An apparatus for controlling a throttle valve electronically in an internal combustion engine. The actuator 2 is supported on a body 1A by fixing a base plate 7 to a flange 1B of the body 1A with a bolt 6, and an elastic member 9 is fixed at an outer surface of a cylindrical projection 2C which is positioned on one end 2B of the body of the actuator 2. The inner surface of a case 1C of the body 1A covers cylindrical projection 2C. One end 2B of the body of the actuator 2, opposite the actuator output end, is thus supported by the body 1A via elastic member 9. Therefore, it is not necessary to provide a heavy wall thickness of the flange by which the actuator 2 is supported or of the body of the actuator, and increase the strength of the internal structure of the actuator, and increase weight, size, and cost of the actuator.

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Fig. 1

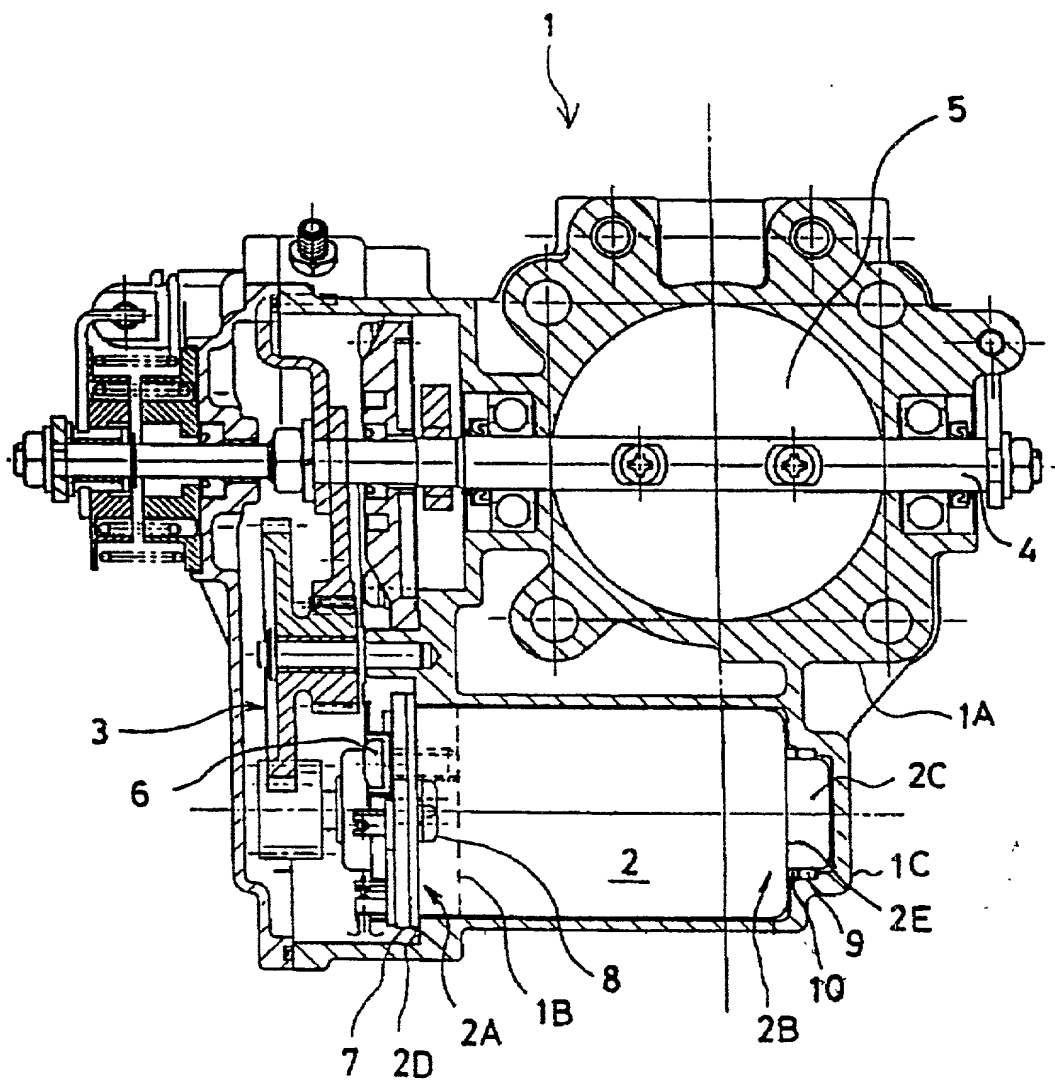


Fig. 2

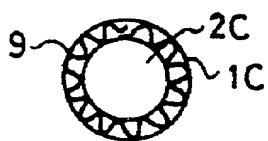


Fig. 3(A)

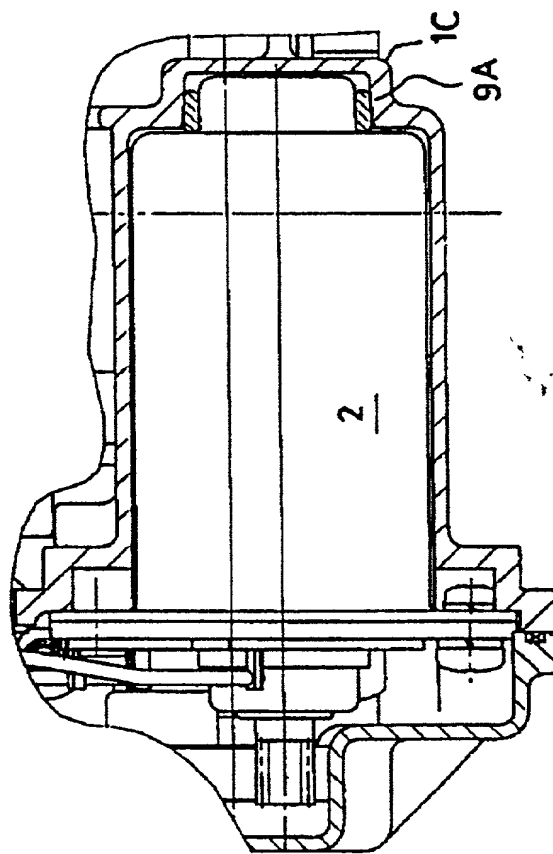


Fig. 3(B) Fig. 3(C)

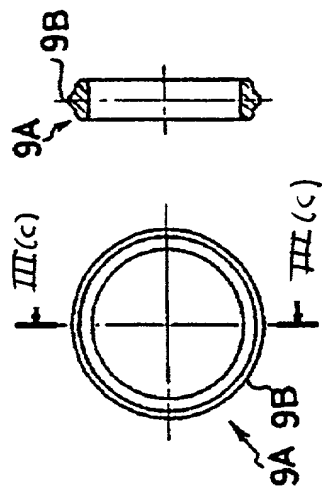


Fig. 4

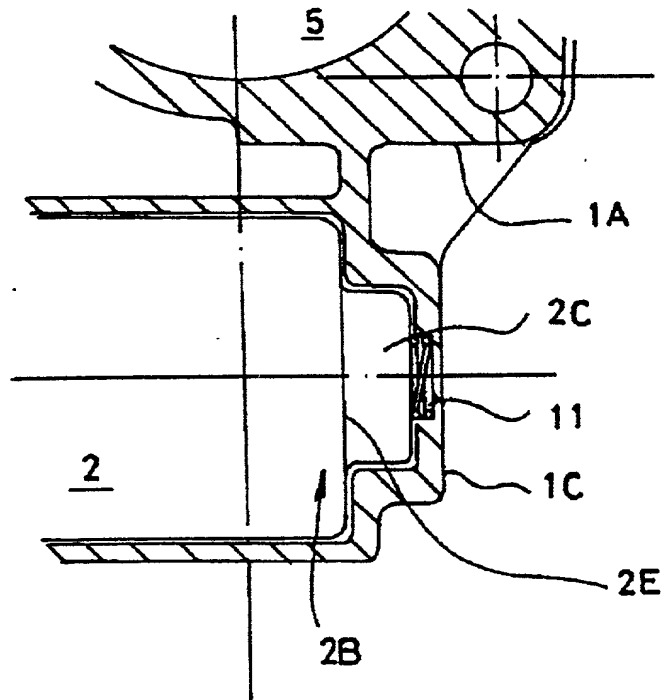


Fig. 5(A)

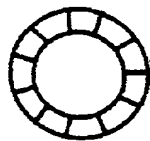
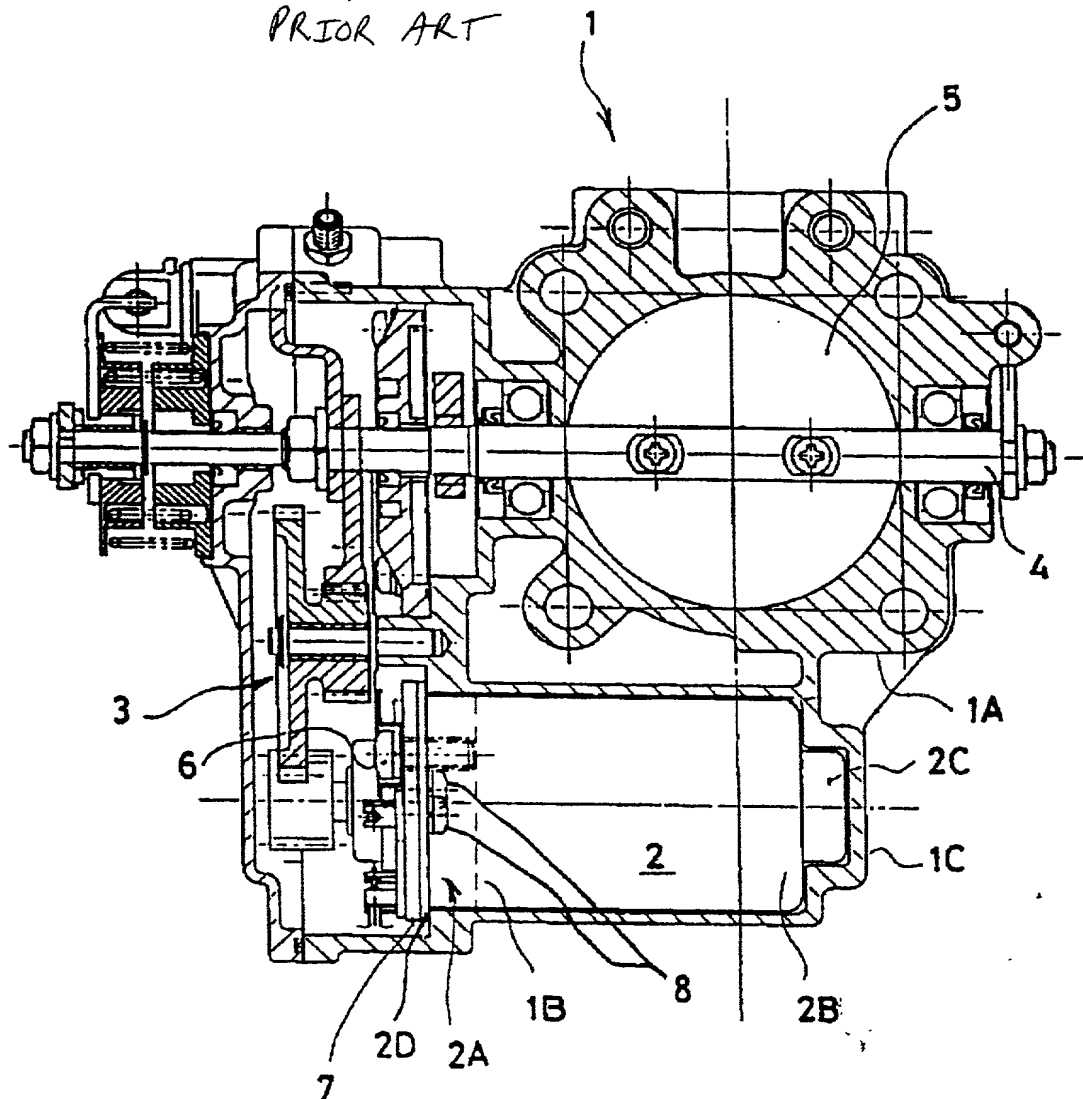


Fig. 5(B)



Fig. 6
PRIOR ART



86500-6905E060

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Declaration and Power of Attorney For Patent Application

特許出願宣言書及び委任状

Japanese Language Declaration

日本語宣言書



下記の氏名の発明者として、私は以下の通り宣言します。

As a below named inventor, I hereby declare that:

私の住所、私書箱、国籍は下記の私の氏名の後に記載された通りです。

My residence, post office address and citizenship are as stated next to my name.

下記の名称の発明に関して請求範囲に記載され、特許出願している発明内容について、私が最初かつ唯一の発明者（下記の氏名が一つの場合）もしくは最初かつ共同発明者であると（下記の名称が複数の場合）信じています。

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

AN APPARATUS FOR CONTROLLING A THROTTLE
VALVE ELECTRONICALLY IN AN INTERNAL
COMBUSTION ENGINE

AN APPARATUS FOR CONTROLLING A THROTTLE
VALVE ELECTRONICALLY IN AN INTERNAL
COMBUSTION ENGINE

上記発明の明細書（下記の欄でx印がついていない場合は、本書に添付）は、

the specification of which is attached hereto unless the following box is checked:

☒ 3月5日に提出され、米国出願番号または特許協定条約国際出願番号を09/035069とし、
（該当する場合）に訂正されました。

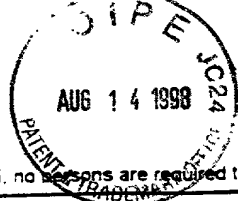
☒ was filed on March 5, 1998
as United States Application Number or
PCT International Application Number
09/035,069 and was amended on
(if applicable).

私は、特許請求範囲を含む上記訂正後の明細書を検討し、内容を理解していることをここに表明します。

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

私は、連邦規則法典第37編第1章56項に定義されたとおり、特許資格の有無について重要な情報を開示する義務があることを認めます。

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.



Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Japanese Language Declaration (日本語宣言書)

私は、米国法典第35編119条(a)-(d)項又は365条(b)項に基づき下記の、米国以外の国の少なくとも一ヶ国を指定している特許協力条約365(a)項に基づく国際出願、又は外国での特許出願もしくは発明者証の出願についての外国優先権をここに主張するとともに、優先権を主張している、本出願の前に出願された特許または発明者証の外国出願を以下に、枠内をマークすることで、示しています。

Prior Foreign Application(s)

外国での先行出願 9-058662	Japan
(Number) (番号)	(Country) (国名)
_____	_____
(Number) (番号)	(Country) (国名)
_____	_____

I hereby claim foreign priority under Title 35, United States Code, Section 119 (a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

Priority Not Claimed

13/March/1997	優先権主張なし
(Day/Month/Year Filed) (出願年月日)	<input type="checkbox"/>
_____	<input type="checkbox"/>
(Day/Month/Year Filed) (出願年月日)	

私は、第35編米国法典119条(e)項に基づいて下記の米国外特許出願規定に記載された権利をここに主張いたします。

(Application No.) (出願番号)	(Filing Date) (出願日)
_____	_____

I hereby claim the benefit under Title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below.

(Application No.) (出願番号)	(Filing Date) (出願日)
_____	_____

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I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s), or 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code Section 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of application.

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Japanese Language Declaration

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Japanese Language Declaration



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